SECTION 26 5100

INTERIOR LIGHTING

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LANL MASTER SPECIFICATION

When editing to suit project, author shall add job-specific requirements and delete only those portions that in no way apply to the activity (e.g., a component that does not apply). To seek a variance from applicable requirements, contact the ESM Electrical POC.

When assembling a specification package, include applicable specifications from all Divisions, especially Division 1, General Requirements.

Delete information within “stars” during editing.

Specification developed for ML-3 projects. For ML-1 / ML-2, additional requirements and QA reviews are required.

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PART 1 GENERAL

1.1 SUMMARY

A. SECTION INCLUDES

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Edit to suit project requirements

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1. Interior luminaires and accessories
2. Lamps.
3. Ballasts.

B. LANL PERFORMED WORK

1. None

C. DEFINITIONS:

1. Luminaire: A luminaire is a complete lighting unit including lamp(s) and parts required to distribute the light, position and protect the lamp(s), and connect the lamp(s) to the power supply.
2. Average Life: The time after which 50 percent will have failed and 50 percent will have survived under specified operating and starting condition.

1.2 ENVIRONMENTAL REQUIREMENTS

A. Provide luminaires, lamps and ballasts, suitable for operation at an altitude of 7500 feet above sea level and in the environment in which they will be used.

1.3 SUBMITTALS

A. Submit the following in accordance with Section 01 3300, Submittal Procedures:

1. Catalog Data: Submit catalog data describing luminaires, lamps, and ballasts. Include data substantiating that materials comply with specified requirements. Arrange data for luminaires in the order of fixture designation.

2. Performance Curves/Data:

a. Submit certified photometric data for each type of luminaire.

b. Submit supply-air, return-air, heat-removal, and sound performance data for air handling luminaires.

3. Drawings: Submit manufacturer's shop drawings for non-standard luminaires.

4. Warranty: Submit warranties for luminaires and for electronic ballasts.

5. Maintenance Data: Submit maintenance instructions for inclusion in the operations and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Comply with the National Electrical Code (NEC) for components and installation.

B. Provide luminaires listed and labeled by a nationally recognized testing laboratory (NRTL) for the application, installation condition, and the environments in which installed.

C. Use manufacturers that are experienced in manufacturing luminaires, lamps and ballasts similar to those indicated for this Project and have a record of successful in-service performance.

D. Coordinate luminaires, mounting hardware and trim with the ceiling system.

1.5 EXTRA MATERIALS

A. Furnish the following extra materials matching products installed. Package with protective covering for storage and identify with labels describing contents.

1. Provide 5 percent of quantity of fluorescent lamps of each type, but no fewer than two lamps of each type.

2. Provide 5 percent of quantity of high intensity discharge (HID) lamps of each type, but no fewer than two lamps of each type.

3. Provide 10 percent of quantity of incandescent lamps of each type, but no fewer than two lamps of each type.

4. Provide 1 percent of quantity of louvers and lenses of each type, but not less than one of each type.

5. Provide 1 percent of quantity of ballasts of each type, but not less than one of each type.

1.6 WARRANTY

A. Electronic Ballasts: Submit a warranty, mutually executed by the ballast manufacturer and the installer, agreeing to replace electronic ballasts that fail in materials or workmanship within five years, beginning on the date of manufacture. This warranty is in addition to, and not a limitation of, other rights and remedies LANL may have under the Contract Documents.

1.7 RECEIVING, STORING AND PROTECTING

A. Receive, store, and protect, and handle products according to NECA 1—Standard Practices for Good Workmanship in Electrical Construction.

PART 2 PRODUCTS

2.1 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to Section 01 2500, Substitution Procedures.

2.2 INTERIOR LUMINAIRES

A. Furnish interior luminaires that comply with requirements specified below, indicated on the Drawings, and as required to meet conditions of installation.

B. Furnish metal parts free from burrs and sharp corners and edges.

C. Furnish metal components that are formed and supported to prevent sagging and warping.

D. Furnish steel parts that are finished with manufacturer's standard finish applied over a corrosion-resistant primer. Provide luminaires with finish free from runs, streaks, stains, holidays or defects.

E. Provide doors and frames that are smooth operating and free from light leakage under operating conditions. Relamping shall be possible without the use of tools. Doors, frames, lenses and diffusers shall be designed to prevent accidental falling during relamping and when secured in the operating position.

F. Provide luminaires with minimum reflecting surface reflectance as follows unless specified otherwise on the Drawings:

1. White Surfaces: 85 percent

2. Specular Surfaces: 83 percent

3. Diffusing Specular Surfaces: 75 percent

G. Provide lenses, diffusers, covers and globes that are 100 percent virgin acrylic unless specified otherwise on the Drawings. Provide minimum 0.125 inches lens thickness. Provide injection molded lenses for fluorescent troffers.

H. Provide luminaires that conform to UL 1598 - Fluorescent Lighting Fixtures.

2.3 LAMPS

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Edit specification to suit project requirements
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A. Furnish lamps that comply with requirements specified below and the luminaire schedule on the Drawings.

B. Furnish lamps that conform to the NEMA C78 standard applicable to each type of lamp.

C. For fluorescent general lighting in interior spaces furnish energy-efficient T-8 lamps with the following features:

1. T-8 bulb with 48 inch nominal length.

2. Medium bi-pin base.

3. 3500 ºK color temperature

4. 20,000 hours average life with 3 hours between starts.

5. 2850 minimum initial lumens after 100 hours of operation.

6. Lumens at 40 percent of rated life not less than 95 percent of initial lumens.

7. Color rendering index (CRI) of at least 75.

8. Pass the EPA Toxic Characteristic Leachate Procedure (TCLP) test for hazardous waste determination.

D. For fluorescent accent lighting and downlighting in interior spaces furnish energy-efficient compact fluorescent lamps with the following features:

1. 3000 to 3500 ºK color temperature

2. Minimum 10,000 hours average life with 3 hours between starts.

3. Lumens at 40 percent of rated life not less than 80 percent of initial lumens.

4. Color rendering index (CRI) of at least 80.

E. For pulse-start metal-halide general lighting in interior spaces furnish lamps with 3700 to 4000 K color temperature and color rendering index (CRI) of at least 65.

F. For high-pressure sodium general lighting furnish improved color quality lamps with 2200 K color temperature and color rendering index (CRI) of at least 65.

G. Manufacturers: GE Lighting, North American Phillips, Sylvania

2.4 FLUORESCENT LAMP BALLASTS

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Edit specification to suit project requirements.
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A. For general fluorescent lighting provide solid-state, full-light-output type, programmed start, electronic fluorescent ballasts that comply with ANSI C82.11 and have the following characteristics:

1. Conform to UL 935 - Fluorescent Lamp Ballasts.

2. High power factor, at least 0.90.

3. Class P, sound rated "A".

4. Contain no PCB's.

5. Line current total harmonic distortion (THD) 15 percent or less.

6. Minimum operating frequency 20 kHz.

7. Minimum starting temperature: 0 degrees F.

B. For dimmer controlled fluorescent lighting in heated interior spaces (maintained above 50ºF) provide solid-state, controllable electronic fluorescent ballasts with the following additional characteristics:

1. Conform to UL 935 - Fluorescent Lamp Ballasts.

2. High power factor, at least 0.90.

3. Class P, sound rated "A".

4. Contain no PCB's.

5. Total line current harmonic distortion less than 15 percent throughout the dimming range.

6. Continuous dimming from 100 percent to 5 percent.

7. Minimum starting temperature: 50 degrees F.

C. Manufacturers: Advance, GE Lighting, Universal

D. For fluorescent emergency ballasts refer to Section 26 5200, Emergency Lighting.

2.5 HIGH INTENSITY DISCHARGE LAMP BALLASTS

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Edit specification to suit project requirements.
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A. Provide pulse-start metal-halide and high pressure sodium ballasts that comply with requirements specified below for lamps specified in this Section and the luminaire schedule on the Drawings:

1. Conform to UL 1029 - High-Intensity-Discharge Lamp Ballasts and NEMA C82.4 - Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.

2. Constant wattage auto-transformer (CWA) or regulator, high-power-factor type.

3. Ballasts shall incorporate a solid-state igniter/starter with an average life in the pulsing mode of 4,000 hours at an igniter/starter case temperature of 90 C.

B. Manufacturers: Advance, GE Lighting, Universal

2.6 LUMINAIRE ACCESSORIES

A. Provide stud supports, mounting brackets, frames, plaster rings and other accessories required for luminaire installation.

B. Furnish hangers as specified below and as required by conditions of installation:

1. Provide single stem hangers made of 1/2-inch steel tubing with swivel ball hanger fitting and ceiling canopy. Finish shall be the same as the luminaire.

2. Provide twin stem hangers made with dual 1/2 inch steel tubes and ceiling canopy to mount a single luminaire. Finish shall be the same as the luminaire.

3. Provide rod hangers made of 1/4 inch threaded steel rod with zinc-plated finish.

4. For HID luminaires provide hook hangers that are integrated assemblies matched to the luminaire and line voltage; equip with threaded attachment, power cord and locking type plug.

C. Provide T-bar safety clips for lay-in fluorescent luminaires.

PART 3 EXECUTION

3.1 EXISTING WORK

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Edit specification to suit project requirements.
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A. Disconnect and remove luminaires, lamps, and accessories as indicated on the Drawings.

B. Extend existing interior luminaire installations using luminaires, lamps, and installation methods compatible with existing installations, or as specified.

C. Clean and repair existing luminaires that are to remain or are to be reinstalled.

1. Replace magnetic ballasts with specified electronic ballasts for T-8 lamps.

2. Replace T-12 lamps with T-8 lamps as specified.

3. Replace discolored lenses with new specified lenses.

3.2 INSTALLATION

A. Install interior lighting system in accordance with the NEC, manufacturer's instructions, approved shop drawings, and the following NECA National Electrical Installation Standards:

1. NECA/IESNA 500, Recommended Practice for Installing Indoor Commercial Lighting Systems (ANSI)

2. NECA/IESNA 502, Recommended Practice for Installing Industrial Lighting Systems (ANSI).

B. Have the manufacturer's installation instructions available at the construction site.

C. Where the ceiling forms the protective membrane of a fire resistive assembly, install protective coverings over luminaires in accordance with NRTL requirements.

D. Where luminaires are supported from a suspended ceiling support system, install not less than two support rods or wires per luminaire. Locate support rods or wires not more than six inches from luminaire corners.

E. Provide seismic restraints for luminaires in accordance with the requirements of Section 13 4800, Sound, Vibration and Seismic Control.

F. Brace pendants and rods that are 4 feet and longer to limit swinging.

G. Connect luminaires in suspended ceilings using 6 ft. lengths of flexible metal conduit.

3.3 PROVISIONS FOR DUAL-LEVEL LIGHTING CONTROL

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Edit specification to suit project requirements. Delete if not applicable.
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A. In spaces 100 square feet and larger provide luminaires suitable for dual-level control; provide multi-lamp fluorescent troffers with two ballasts that can be separately controlled.

B. Coordinate circuiting of luminaires having manual control and automatic control so the manual control can reduce the lighting load by at least 50 percent in a reasonably uniform lighting pattern.

C. Coordinate placement and circuiting of luminaires with daylighting apertures, such as windows.

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NOTE TO DESIGNER: The luminaire schedule on the Drawings should contain the following information:

1. Fixture type designation (e.g. "A").
2. Description of fixture (e.g. "2'x4' four lamp lay-in fluorescent troffer with hinge and latch flush steel door").
3. Description of finish (e.g. "Baked white enamel finish").
4. Description of lens or louver (e.g. "Prismatic K-12 pattern acrylic lens").
5. Description of ballast if applicable (e.g. "277V electronic ballast").
6. Description and quantity of lamps (e.g. "4-F32T8/835 lamps").
7. Manufacturer and catalog number (e.g. "XYZ #123456-7890").

Minimize the number of lamp and ballast types on each project.

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END OF SECTION

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Do not delete the following reference information:

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FOR LANL USE ONLY

This project specification is based on LANL Specification 26 5100, Rev. 0, dated January 6, 2006.